Locomotive Performances.

MESSRS. EDITORS—Observing in your paper of the 9th, in chronicling a locomotive feat (which was underrated), an expression of doubt as to its correctness, I send you the enclosed, clipped from the Cleveland *Herald*, of August 19th, which, you will perceive, emanates from the office of the Superintendent of the Cleveland and Pittsburgh R. R., being the result of a trial with the locomotive *Rocket* of our manufacture. We believe, from our knowledge of the matter, the statements made to be strictly correct; would say further, that on a subsequent trial with the *Rocket* she ran from Cleveland to Wellsville, 104 miles, with 89 cubic feet of wood. We have the affidavit of the engineer upon the locomotive *Nashville*, as to the correctness of his statement (which you doubt), backed by the certificate of superintendent of machinery on Cleveland and Columbus, and Cleveland and Erie R. R., and could procure affidavits of the other statements made were it necessary. These experiments have been made without our participation, and are the result of tests made to compare the relative merits of locomotives, and must be gratifying to all lovers of progress in manufactures, as they certainly are to us.

W. B. CASTLE,
Secretary of Cuyahoga Steam Furnace Co.

The following is the article in the Cleveland *Herald*, to which our correspondent refers:

It is but three days since we noticed the performanoe of a locomotive built at the Cuyahoga Works, which ran 295 miles, using but one tender of wood.

We have been furnished by Superintendent Durand with the following statement:

SUPERINTENDENT'S OFFICE, C. & P. R. R.,
CLEVELAND, Aug. 17, 1854.

The locomotive *Rocket*, built by the Cuyahoga Steam Furnace Company, Cleveland, George Moores, engineer, Edward Reed, fireman, ran three times over the entire length of the Cleveland and Pittsburg railroad, and once from Cleveland to Alliance and back, also four times between the Pier and the machine shop at Cleveland, performing the entire distance of 430 miles with one tender of wood.

DETAILS OF TRIP.—Distance run with three cars, 249 miles; distance run with four cars, 171 miles; distance ran with engine alone, 10 miles; total distance, ascending 40 by 50 feet grade, 102 miles; total ascent of all grades in distance run, 5,439 feet; total number of stops, 71.

Of course it will not be disputed that Engineer Moores and fireman Reed were determined to see what the *Rocket* could do; neither will it be claimed that ordinary engineers and firemen could perform the feat.

But it shows what an engineer of admirable skill, and a fireman of extrordinary judgment, can do with one of the engines made at the Cuyahoga Works. It shows, too, that it is for the interest of the railroad Companies to employ first class men, and to pay such men.

We do not know what the facts may be, but suppose, of course, the tender was packed full of wood. It is a tender of usual size for a first class express engine, and thus packed, can be made to hold say three cords of wood. To run this distance of 430 miles with an ordinary machine, as ordinarily handled, would require about twelve cords of wood. The saving is easily cyphered out."

The article referred to, appeared on page 412 of our last volume. We, indeed, did doubt such performances referred to, and are glad to have that doubt pleasantly dispelled; but we are not the less astonished. We would also state that we received a letter from Joseph E. Holmes, Engineer of the Newark Machine Works, Ohio, who, like us, also doubted the public statements referred to; and he went to the machine shop of the Cleveland and Columbus R. R., in Newark, and was informed by the superintending engineer, J. W. Reynolds, and several other respectable gentlemen, of the correctness of the above statements. It affords us much pleasure to present such facts; "they are truly gratifying to all the lovers of progress" in the mechanic arts.

Engineering Experiments—Testing an Engine.

MESSRS. EDITORS—Thinking it a matter that would necessarily interest you, as *the* mechanical journalists of our country, we beg to submit to your examination a test made, a day or two since, of the capacity of a steam engine employed in this city, by Messrs. Clapp & Henry, of 12 inches diameter of cylinder, and 18 inches stroke, working during the test under a pressure on the safety valve (verified by that on the "pressure gauge" attached also the boiler) of 57 lbs. to the square inch. The engine, during labor, balanced perfectly 320 lbs., suspended on the lever of the dynamometer (a sketch of which we enclose herewith) at a point precisely 5½ feet distant from its center (and of course thus far distant from the center of the engine shaft.) The uniform speed maintained by the engine during the test being 125 to 128 revolutions per minute.

The results (which we regard *extraordinary*) we calculated thus:

The weight sustained being 320 lbs., at 5½ ft. radius, with revolutions, say 125 per minute.

5½ × 2 = 11 = diameter of circle described.

11 × 31·416 = 34·557 = circumference of circle in feet.

34·557 × 125 = 4319·625 = number of feet attained per minute.

4319·625 × 320 = 1382280 = or effect in pounds raised one foot in a minute.

Which reduced to H. P. by dividing with 33·000 equals 41·80 horse power.

The experiment, being new in our section, elicited, as you may imagine, a good deal of interest, and with it considerable solicitude that the figures attained should be submitted to your inspection. J. S. WINTER,
President of the Montgomery Iron Works.
Ala., Sept. 6th, 1854.

[The result is, indeed, extraordinary.

Mr. Winter has also sent us a drawing of the brake which was applied to test the engine.

The Copper Mines of Lake Superior.

A visitor to the copper mines of Lake Superior contributes to the Detroit *Advertiser* some account of the mining operations in the great copper district of Lake Superior. He says:

"The vein is made of vein-stone and mass copper. The mass copper is entirely pure metallic copper. The vein-stone has fine particles of copper diffused through it. This is called *stamp*-copper, because the stone has to be stamped (crushed) or pulverized, in order, by washing, to separate the copper from the stone.

The underground captain is from Cornwall, and most of the miners are Cornish. I asked the captain how mining here compared with that of Cornwall, to which he replied that it was less irksome and unhealthy. There the miner became dripping wet almost as soon as he had entered the mine, while these miners were almost entirely dry. There, so great was the depth that the heat was almost suffocating, an hour and a half being required to ascend to the surface, the air being so foul as to be often scarcely capable of sustaining life, while here no inconvenience was yet felt from these causes.

A miner in Cornwall, he said, was not expected to live beyond the age of about forty. At thirty-five and forty miners generally were broken down and given over to die.

The vein-stone, as it comes from the mine in chunks, is piled up and burned for twenty-four hours, as lime is buraed, tc prepare it for pulverizing the more readily. At the same time the burning liberates a considerable portion of the mass copper which may be contained in the vein-stone, consisting of bits of from a few ounces to several pounds weight. This is put into casks, and is called barrel copper; the remaining portion of pure mass copper contained in the vein-stone is liberated by the stamping, and is separated for barreling in like manner.

The stamping machinery is very simple, consisting of massive cast-iron weights, which are lifted by the revolving machinery, and left to descend by their own gravity, crushing the vein-stone as it passes beneath them. These crushers are raised by means of projections in a revolving cylinder, one set of which is ready to lift them as soon as another has let them fall.

After passing under the stampers, the resulting mixture of copper and sand is subjected to various washings and rinsings, called *jigging*, *puddling*, &c. Some of it comes out entirely clean, another portion, finer, contains a small percentage of sand, and yet another a still greater proportion of sand, each quality being barreled by itself. This is called *stamp copper*. The percentage of sand left in that of the lowest quality is perhaps 33 per cent., and it is subject to that amount of discount in the market, the price of pure copper being from $500 to $600 per tun, or from 25 to 30 cents per pound."

New Marine Engines.

An iron screw steamship, named the *Brandon*, recently arrived at this port from Havre, and having heard that her engines were of peculiar construction, we took the opportunity, while she was here, of examining them. She has two engines, with two steam cylinders for each—one a small high pressure, and the other double the size, which receives the steam from the first, works it expansively, and is connected with the condenser. This is the Wolfe principle, and its first application to a steamship, we believe. Its economy has been proved by this vessel, inasmuch as she only consumed 13 cwt. of coal an hour on her passage out, frequently running 12 knots an hour, and made the passage in 16 days; an excellent one for a ship of 1,000 tons burden. She has only two tubular boilers, each smaller than those on our river boats; so it is impossible to raise a great deal of steam. The economy of this vessel is obtained from the manner of working the steam, which is somewhat expanded in the small cylinder, and then greatly expanded in the larger one. The crank shaft of each engine has a large toothed wheel gearing into a pinion on the propeller shaft. The two wheels are geared to the one pinion opposite to one another, and run in opposite directions; they exhibit a complete piece of millwrighting. The two engines weigh only 60 tuns—no more than the bed-plates of the *Atlantic*. She consumes only 15½ tuns of fuel per day; and the engines are as easy to handle, the engineer said, "as a child!" This vessel, entire, engines and all, was built on the Clyde, by a new engineering firm—but old Engineers—Randolph and Elder, and is the first they have built. We must say, that the engines, in all their details, are the most compact and complete that we have seen. Our engineers, who have examined them have spoken in unmeasured terms in their praise.

Coal.

We understand that the coal dealers in this city are trembling for their fate, because the people *keep off* and do not buy, and the dealers are in want of money. There was certainly no necessity for the great rise in the price of coal this year, for the crop of fuel at the mines, we presume, was neither affected by the heat nor drouth; nor did the war in Europe make any extra demands upon the Pennsylvania Railroads. It is our opinion that things might be so managed that coal can be sold in this city at fair remunerating prices for five dollars per tun. When coal is cheap the poor rejoice, for in our northern climate there is a great amount of suffering every winter among them on account of the high price of fuel. It is our opinion that the large coal companies have made a great mistake this year in raising the price of fuel so unreasonably high; their conduct has greatly lowered their character in this community.

There is one thing that we cannot understand with respect to the method of doing business by some of the coal dealers in this city; that is, the difference of price at which one sells in comparison with another. Thus we have noticed that one dealer advertises the same coal for $6,50 per tun that all the others (nearly) sell at $7,50. How is this, does he give the same weight as those who sell at a higher price? At the mines a tun weighs 2,470 lbs.; in this city, we are told, it never weighs more than 2,000 lbs., and some say that it weighs in some dealers' carts nearer 1,800 lbs. There ought to be some means adopted by our city authorities for supervising the weight of coal in carts, as sold to customers. When a person goes into a grocery he can see for himself whether he gets full weight or measure, but it is very different with coal in carts. It is our opinion that there is no small amount of deception practiced by many coal dealers; this should be looked to by those who are appointed to look after the interests of the people.

Foreign Crops.

The news from abroad respecting the crops in Europe, inform us that there is more than an average yield of wheat and other grains, and that no flour will be required from America. Indeed at the present moment the flour is much lower in price in Liverpool than in New York. Some of our agricultural cotemporaries inform us that the corn crop, which was supposed to be destroyed by the drouth in many places, is coming in far better than was expected. It is asserted that there was more than one-fifth corn planted this than there was last year, and that, at the most, there will not be a failure of more than one-fourth of the whole crop. Provisions, therefore, in all likelihood, will be lower in the course of a month or so, than they now are, because there are none wanted for the foreign market, and the demand at home must regulate the price.

Explosion of a Boiler.

We have received from J. Todd, of Madison, Ind., a sketch and description of a boiler which recently exploded in that place; it was a vertical one of cylindrical form, with the furnace at the bottom in the center, and the heating surface running up through the interior in a conical form. The boiler was 8 feet long and 3 feet in diameter, with a sheet iron chimney long enough to reach 20 feet above a three story house. The flue was 3 feet at the bottom, and only 12 inches at the top, leaving only about three inches of water space at the bottom of the boiler. The house in which this boiler was placed was blown to atoms—not a brick or stone left unturned. The boiler itself was forced up into the air to such an astonishing hight that it appeared in size like a lard keg to those who witnessedit. It fell three hundred feet from the place where it exploded. No person was hurt, but the engineer made a very narrow escape, and in the shop where the boiler fell a bench was broken, where a man had been working only one second before. It is supposed that the boiler was projected a least 1,000 feet high into the air.

Discoveries in Metals.

M. Deville, of Paris, has, for a long time, been engaged in the preparation of a work upon the pure metals, produced and melted by processes of his own. In the course of his researches he has discovered that the two metals, nickel and cobalt, possess, contrary to the general belief, the useful properties of malleability and ductility in a very remarkable degree, and also an extraordinary tenacity, far superior to that of iron, which has hitherto been supposed to possess this quality more perfectly than any of the metals. From M. Vertheim's experiments on wires of equal diameter, made of iron, nickel and cobalt, it appeared that the weights which determined the rupture of the several wires were respectively as the numbers 60 for iron, 90 for nickel, and 115 for cobalt. This would establish for cobalt a tenacity almost double that of iron. It is asserted that they may be, moreover, worked at the forge with the same facility as iron. They are less subject to oxydation than iron, and may be used for the same purposes.

By the Savannah papers, we are informed of that city being visited with a hurricane, on the same day that Charleston was. It did a great deal of damage.